

Date: Tuesday, 6/26/2007 3:09:25 PM
 User: Kim Johnston

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : OH-58 AFT X-TUBE ASSEMBLY - ~~UNDER REVIEW~~
 Job Number : 33151
 Estimate Number : 10246
 P.O. Number : N/A Part Number : D058676201
 This Issue : 6/26/2007 S.O. No. : N/A Drawing Number : D058-676-241 REV A2
 Prsht Rev. : NC Project Number : N/A
 First Issue : N/A Type : LANDING GEAR Drawing Revision : A2 ~~UNDER REVIEW~~ PH 07.06.27
 Previous Run : 33150 Material : N/A
 Due Date : 7/30/2007 Qty: 1 Um: Each
 Written By :
 Checked & Approved By : 07.06.27
 Comment : Est Rev: 04.02.16 Reformat KJ/DS

Additional Product

Job Number:



Seq. #: Machine Or Operation: Description :

1.0 DC DOCUMENT CONTROL



KS 07.07.26 ①

Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D058-676-201CHG001

07/12/03

2.0 D6007106 Crosstube



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6007-106 Crosstube 13 2F799

- Check OD = 2.250"; ID = 1.550"

2F 07/14/08

3.0 MORI SEIKI MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA086

2-Turn first side as per Folio FA086

3-Deburr & Inspect for surface damage.

2F 07/14/08

4.0 QC1 INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

2.5 07/11/09

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D058-676-201 PAR #: 207 Fault Category: Eng Design NCR: Yes ☒ No ☐ DQA: 10 Date: 07/12/14
QA: N/C Closed: _____ Date: _____

NCR: <u>PAR 207</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
07.11.12	3	Cuffs are +0.070 long from nominal dim (2.267) OD dims are OK	<u>CP</u> 07.11.12 per QS1042	PARTS ARE OK.	N/A	<u>10-11-13</u>	<u>CP</u> 07.11.12 per QS1042	<u>10-11-13</u>
07.11.12	4	FAL sheet missing dims to measure cuff length.	<u>CP</u> 07.11.12 per QS1042	Add cuff length to FAL. GET ENG SIGN-OFF AS REQ'D UNTIL DWG UPDATE w/ MORE REASONABLE TOLERANCE	See PAR 207	<u>10-11-13</u>	<u>QS1042</u>	<u>10-11-13</u>
07.11.12	4	Eng dwg shows cuff length ± 0.001 , should be ± 0.030 .	<u>CP</u> 07.11.12 per QS1042	Update dwg. to add correct cuff tolerance.	See PAR 207	<u>10-11-13</u>	<u>QS1042</u>	<u>10-11-13</u>

NOTE: Date & initial all entries

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Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA086

2-Deburr & Inspect for surface damage.

2.5 07/11/09

6.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

2.5 07/11/09

7.0

QC8

SECOND CHECK



Comment: SECOND CHECK

2.5 07/11/09

8.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Remove sand and plugs

2-Scribe part # and batch # using vibrating stylus as per Dwg D058-676-241

Inside of Cuff(Donot engrave on outside of tube)

2.5 07/11/09

9.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

AWM

07-11-19

1-Polish entire outside surface of crosstube

10.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

DP

7-11-19

11.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

AWM

07-11-19

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of machining

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Part Number: D058676201

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

DP 7-11-19

13.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D058-676-241 using CNC bender program OH58-af and Folio FT

EL 7-11-19

14.0

QC6

DIMENSIONAL CHECK



Comment: Inspect dimensions and work To Current Step

7-11-20 @

15.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D058-676-241 using drill Jig DT8541 & DT8542

2-Ream hole to finish size in tube as per Dwg D058-676-241 using drill Jig DT8541 & DT8542. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D058-676-241

SR 7-11-21

AWM 7-11-23

16.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of bending and drilling

AWM 7-11-23

17.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

7/11/22 @

18.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

7/11/23 @

19.0

OUTSIDE SERV.10

OUTSIDE SERVICES -LG



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 0380

Issue P/O: 5133

LPI as per ASTM 1417 Level 2

C 207111/26 @

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Job Number: 33151

Part Number: D058676201

Job Number:



Seq. #:

Machine Or Operation:

Description :

Attach copy of NDT results to work order

20.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage Ensure copy of NDT results attached to work order.

07/14/26 (1)

21.0

QC6

DIMENSIONAL CHECK



Comment: Inspect for damage & ensure results are as per Dwg D058-676-241

07/14/24 (K)

22.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

ml 07 11 24 (1)

23.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

07/14/26 (K)

24.0

D2856400

Abrasion Strip



Comment: Qty.: 0.5800 f(s)/Unit Total : 0.5800 f(s)

Pick:

Qty Part number

Description Batch

2 D2856-400-694 Abrasion Strip

34642

ml 07 11 25

25.0

D28911

Support 2.25 dia



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number

Description Batch

2 D2891-1

Support 29108

ml 07 11 25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Job Number: 33151

Part Number: D058676201

Job Number:



Seq. #:

Machine Or Operation:

Description :

26.0

MS2192020

Clamp (per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number

Description Batch

4 MS21920-20

Clamp 102787

ml 07 11 25

27.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Install abrasion strips as per QSI 035 using DT8579

2-Install supports and clamps as per Dwg D058-676-241. Torque clamps to 80-100 in lb.

①
ml 07 11 25
RT 07-11-28

28.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

2/11/30 (14)

29.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

30.0

AN532A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick: Packing Kit

Qty Part number

Description Batch

4 AN5-32A

Bolt

11041936

59

31.0

AN960JD516

Washer



Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)

Pick: Packing Kit

Qty Part number

Description Batch

8 AN960JD516

Washer

1104154

7/12/15D (14)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Job Number: 33151

Part Number: D058676201

Job Number:



Seq. #:

Machine Or Operation:

Description :

32.0

MS21042L5

Nut



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick: Packing Kit

Qty Part number

4 MS21042L5

Description Batch

Nut (or -5)

M105430

7/12/1 SP

(12)

33.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

8 7/12/03 (12)

34.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D058-676-201

Location:

13

07/12/03 SP

(X1)

35.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

12/12/04

Job Completion



12/12/04

33151 D058-676-201

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	33150
Description: Crosstube Assembly (OH-58 High Aft)	Part Number:	D058-676-241
Inspection Dwg: D058-676-241 Rev: A2		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

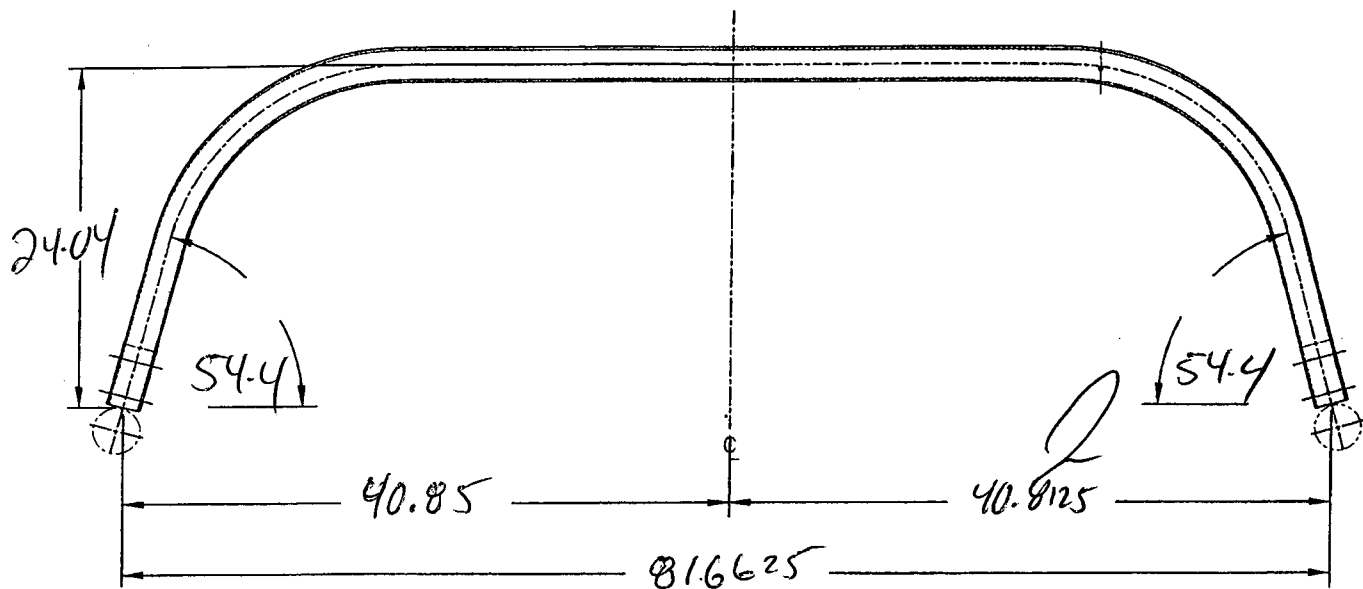
Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.242				
	1.870	+0.005/-0.000	1.872				
	1.956	+0.005/-0.000	1.958				
	2.045	+0.005/-0.000	2.047				
	2.093	+0.005/-0.000	2.095				
	2.140	+0.005/-0.000	2.142				
	2.188	+0.005/-0.000	2.190				
	2.228	+0.005/-0.000	2.230				
	0.186	+0.005/-0.000	.186				
	0.500	+0.005/-0.000	.500				
	R0.063	+0.005/-0.000	.063				
	R0.500	+0.005/-0.000	.500				
SIDE B	103.51	+0.005/-0.000	103.51	/			
	2.240	+0.005/-0.000	2.244				
	1.870	+0.005/-0.000	1.874				
	1.956	+0.005/-0.000	1.960				
	2.045	+0.005/-0.000	2.049				
	2.093	+0.005/-0.000	2.097				
	2.140	+0.005/-0.000	2.143				
	2.188	+0.005/-0.000	2.189				
	2.228	+0.005/-0.000	2.228				
	0.186	+0.005/-0.000	.186				
	0.500	+0.005/-0.000	.500				
	R0.063	+0.005/-0.000	.063				
	R0.500	+0.005/-0.000	.500				

Measured by: J.F.	Audited by: RP	Prototype Approval:	N/A
Date: 07/11/08	Date: 07/11/08	Date:	N/A
Rev	Date	Change	Revised by Approved
A	05.04.27	New Issue (P/O D058-676-201)	KJ/JLM [Signature]

DART AEROSPACE LTD		Work Order:	33150
Description: Crosstube High Aft (OH-58)		Part Number:	D058-676-201
Inspection Dwg: D058-676-241 Rev: A2		Page 1 of 1	

211
09-00-22

Required Dimension	Min	Max
Height	23.92	24.04
1/2 Span	40.86	40.98
Angle	54	56
Total Span	81.72	81.96



Comments

QC15 Inspection	05142
Date	07-11-20

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	fu



DESIGN <i>CP</i>	DRAWN BY <i>CP</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D058-676-241	REV. A SHEET 1 OF 3
DATE 00.11.17		TITLE CROSSTUBE ASS'Y (OH-58 HIGH AFT) NTS	
A	00.11.17	NEW ISSUE	

Qty	Part Number	Description
X	D058-676-241	CROSSTUBE ASSEMBLY (OH-58 HIGH AFT)
1	D6007-106	CROSSTUBE
2	D2856-400-694	ABRASION STRIP
2	D2891-1	SUPPORT
4	MS21920-20	CLAMP

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6007-106
FINISHED LENGTH = 103.51±0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-400-694 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D2891-1 SUPPORT, PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) SEAL EDGES OF SUPPORTS AND ABRASION STRIP USING SIKAFLEX-241/291 SEALANT.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB.

UNDER REVIEW

06.10.18 PH

Update view 0-0

PH 07.06.26

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 33150

RELEASED
00.11.24

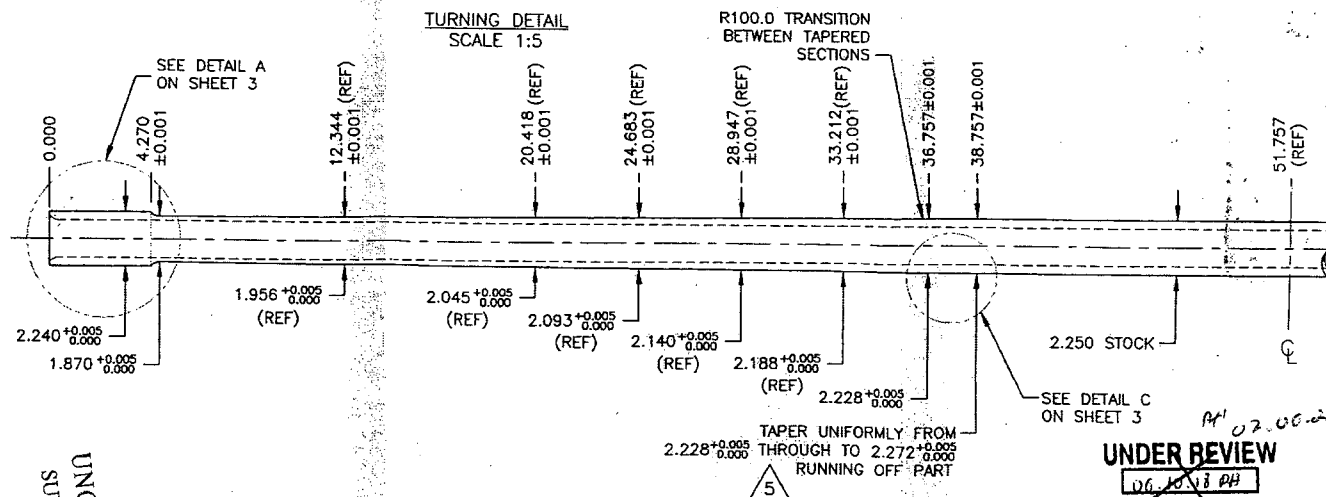
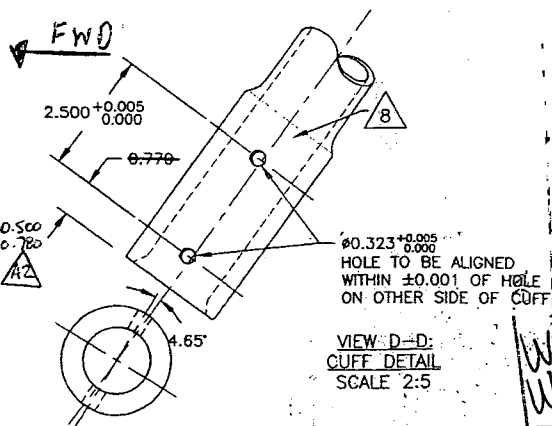
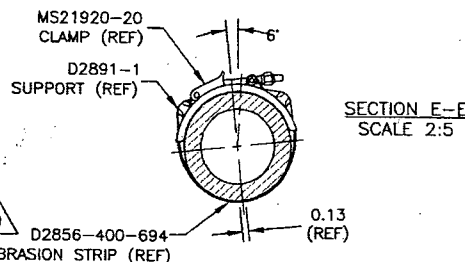
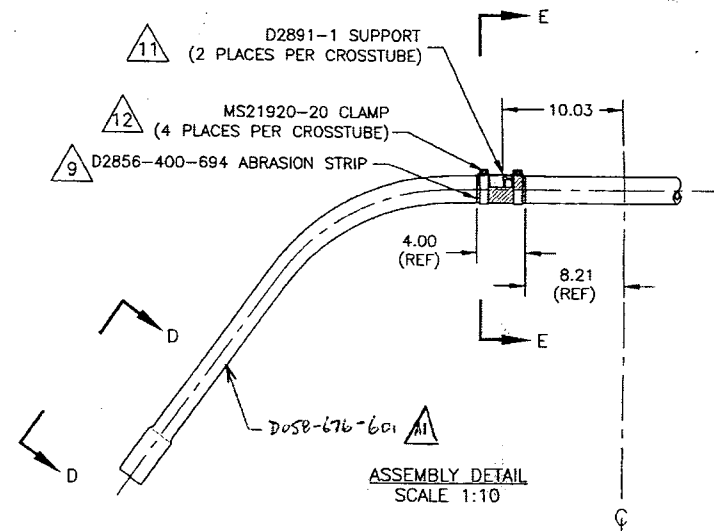
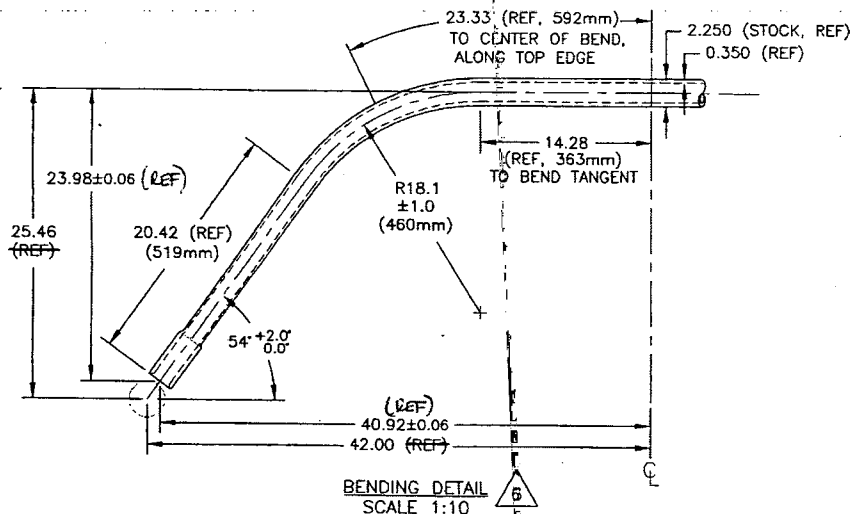
A2	01.07.16	UPDATE DIM TO FIRST HOLE	<i>[Signature]</i> CP
A1	01.03.07	ADD D058-676-601 P/N	<i>[Signature]</i> CP

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RELEASED
06.11.24



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DESIGN ☒
CHECKED ☒
DATE 00.11.17

DRAWN BY ☒
APPROVED ☒

DART DART AEROSPACE LTD.
THAMESBURT, ONTARIO, CANADA

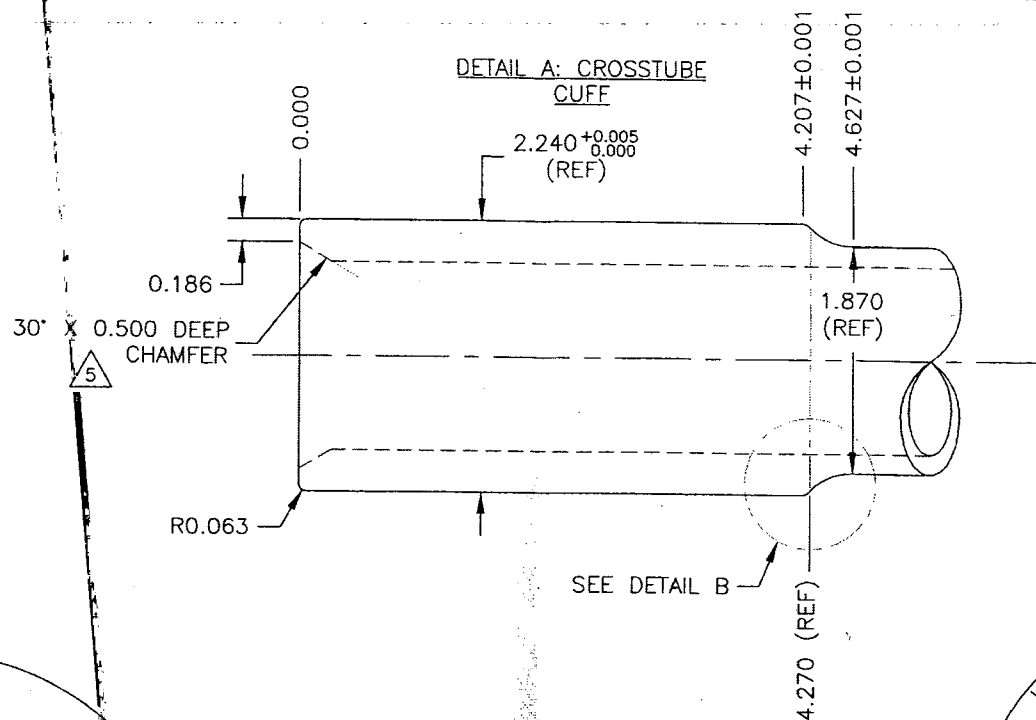
DRAWING NO.
D058-676-241

REV. A
SHEET 2 OF 3

TITLE
CROSSTUBE ASS'Y (OH-58 HIGH AFT) 1:10

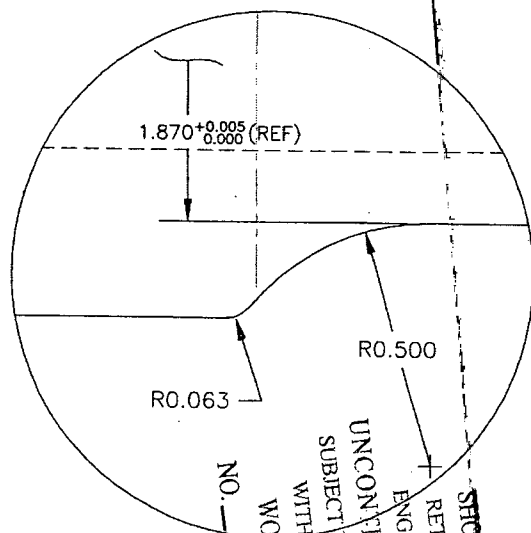
UNDER REVIEW
06.10.18 RH
Update View D-D

RELEASED
00.11.24

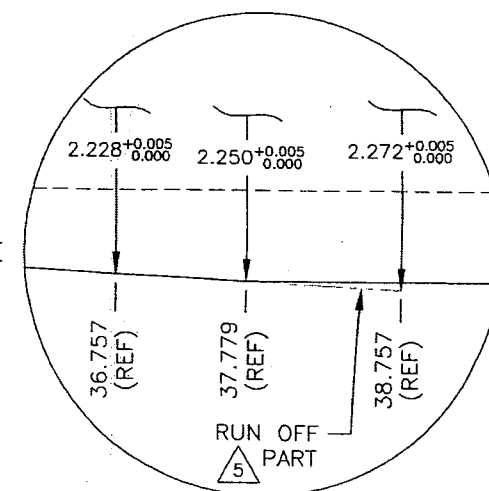


UNDER REVIEW

06.10.04 PH
Update view 0-0
PH
07.06.25



DETAIL C:
TAPER RUN-OFF
NOT TO SCALE



NO. 33151
WORK ORDER
WITHOUT NOTICE
SUBJECT TO AMENDMENT
UNCONTROLLED COPY
ENGINEERING
RETURN TO
SHOP COPY

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DESIGN	4P	DRAWN BY	4P	DART	DART AEROSPACE LTD. MARKHAM, ONTARIO, CANADA
CHECKED	#	APPROVED	#	DRAWING NO. D058-676-241	REV. A SHEET 3 OF 3
DATE	00.11.17	TITLE	CROSSTUBE ASS'Y (OH-58 HIGH AFT)	SCALE	1:1



LIQUID PENETRANT TEST REPORT

P - 1078 1

CLIENT	DART AEROSPACE	DATE	NOV 23 2007	PAGE	1	OF	1
ATTENTION	LINDA LACELLE	ACUREN JOB NO.	188 07 1078	TIME	AM <input type="checkbox"/>	PM <input type="checkbox"/>	
ADDRESS	1270 ABERDEEN ST	PO/VO No.					
	HAWKESBURY, ONT.	WORK LOCATION	HAWKESBURY				
		ACCEPTANCE STD.	ASTM 1417/QSI-038	REV./DATE	2005		
PROJECT	OH 58 FWD/AFT, 407 HIGH AFT X TUBES						
ITEM(S) EXAMINED	JOB#S OH 58: 33149,33150,33151,33153,35530. JOB#S 407: 33324,35713						

JOB DESCRIPTION	PROCEDURE No. LT-0002	REV./DATE	TECHNIQUE No. LT-TECH2	REV./DATE
PART No. D05876101,201/D407667205	MATERIAL	ALODINED ALUM.	THICKNESS	
SCOPE	WET FLOURESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100% EXTERNAL SURFACE			

TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	MAGNAFLUX		BLACK LGHT8171	<input type="checkbox"/> OUTPUT > 1000 μ W/cm ²	<input type="checkbox"/> AMBIENT < 2 fc
PENETRANTZL67	MINIMUM DWELL TIME	45 MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT	<input type="checkbox"/> TROUBLELIGHT
PENETRANT REMOVER H2O	MINIMUM DRY TIME	>10 MIN.	OTHER	CAL SEP 18 07	
DEVELOPER SKDS2	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N	CAL DUE DATE	
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY		

TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input checked="" type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F	<input type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RESULTS- (☐ METRIC ☒ IMPERIAL)

FLUORESCENT LIQUID PENETRANT INSPECTION
CARRIED OUT ON 100% EXTERNAL SURFACE ON:

OH58 FWD X TUBES JOB#S:33149,35530
OH58 AFT X TUBES JOB#S: 33150,33151,33153
407 HIGH AFT TUBE JOB#: 33324,35713

RESULTS: NO INDICATION OF DEFECTS.

ITEMS ACCEPTABLE TO STANDARD.

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner operator and the owner operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE	SIGNATURE	DTR # E27345 52
TECHNICIAN (SIGNATURE):		REPORT REVIEWED BY:
NAME (PRINT): JASON HEWETT	1 ST TECHNICIAN	NAME INITIALS
CGSB LEVEL 2 SNT LEVEL	CGSB LEVEL SNT LEVEL	
CGSB REG. No 6156	CGSB REG. No	

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY